

WHAT IS CLAIMED IS:

1. A liquid crystal display device, comprising:

a first substrate;

a second substrate opposing the first substrate;

5 a liquid crystal layer provided in a gap between the first substrate and the second substrate; and

a temperature adjustment member formed on the first substrate and/or the second substrate,

wherein a panel temperature T ($^{\circ}\text{C}$) of the liquid crystal display device is
10 controlled to be equal to or greater than $T_{\text{NI}}-65$ and less than or equal to $T_{\text{NI}}-15$, where T_{NI} ($^{\circ}\text{C}$) is a nematic-isotropic phase transition temperature of a liquid crystal composition of the liquid crystal layer.

2. The liquid crystal display device of claim 1, wherein a rotational viscosity γ_1 of the liquid crystal composition is less than or equal to 200 mPa·s at a temperature of
15 $T_{\text{NI}}-25$ ($^{\circ}\text{C}$).

3. The liquid crystal display device of claim 2, wherein the rotational viscosity γ_1 of the liquid crystal composition is equal to or greater than 20 mPa·s at a temperature of $T_{\text{NI}}-25$ ($^{\circ}\text{C}$).

4. The liquid crystal display device of claim 1, wherein the temperature
20 adjustment member includes a light-transmissive temperature application section formed on at least one surface of the first substrate and the second substrate, and a temperature control section connected to the temperature application section.

5. The liquid crystal display device of claim 4, wherein the temperature application section is made of a transparent conductive film.

25 6. The liquid crystal display device of claim 4, wherein the temperature application section is formed, by patterning, corresponding to a predetermined display area.

7. The liquid crystal display device of claim 4, wherein a display electrode is formed on the temperature application section via a transparent insulating layer.

8. The liquid crystal display device of claim 4, wherein the temperature application section is an infrared heater.

5 9. The liquid crystal display device of claim 1, wherein the temperature adjustment member includes a Peltier device.

10. A projection type liquid crystal display apparatus, comprising:

a light source;

a color separation optical system for dividing a light beam from the light
10 source into a plurality of color light beams of different colors;

a plurality of liquid crystal display devices provided so as to correspond respectively to the plurality of color light beams separated by the color separation optical system;

a color synthesis optical system for synthesizing together the plurality of color
15 light beams modulated respectively through the plurality of liquid crystal display devices;
and

a projection optical system for projecting the plurality of color light beams, which have been synthesized together by the color synthesis optical system,

wherein at least one of the plurality of liquid crystal display devices is the
20 liquid crystal display device of claim 1.

11. An image shifting device, comprising at least one set of a liquid crystal device for modulating polarization of light and a birefringence device for shifting an optical path of the light according to the polarization of the light output from the liquid crystal device, wherein:

25 the liquid crystal device includes a first substrate, a second substrate opposing the first substrate, a liquid crystal layer provided in a gap between the first substrate and

the second substrate, and a temperature adjustment member formed on the first substrate and/or the second substrate; and

a panel temperature T (°C) of the liquid crystal device is controlled to be equal to or greater than $T_{NI}-65$ and less than or equal to $T_{NI}-15$, where T_{NI} (°C) is a nematic-isotropic phase transition temperature of a liquid crystal composition of the liquid crystal layer.

12. The image shifting device of claim 11, wherein a rotational viscosity γ_1 of the liquid crystal composition is less than or equal to 200 mPa·s at a temperature of $T_{NI}-25$ (°C).

13. The image shifting device of claim 11, wherein a rotational viscosity γ_1 of the liquid crystal composition is equal to or greater than 20 mPa·s at a temperature of $T_{NI}-25$ (°C).

14. The image shifting device of claim 11, wherein the temperature adjustment member includes a light-transmissive temperature application section formed on at least one surface of the first substrate and the second substrate, and a temperature control section connected to the temperature application section.

15. The image shifting device of claim 14, wherein the temperature application section is made of a transparent conductive film.

16. The image shifting device of claim 14, wherein the temperature application section is formed, by patterning, corresponding to a predetermined display area.

17. The image shifting device of claim 14, wherein a display electrode is formed on the temperature application section via a transparent insulating layer.

18. The image shifting device of claim 14, wherein the temperature application section is an infrared heater.

19. The image shifting device of claim 11, wherein the temperature adjustment member includes a Peltier device.

20. The image shifting device of claim 11, wherein the birefringence device includes a temperature adjustment member.

21. An image display apparatus, comprising:

a light source;

5 the liquid crystal display device of claim 1 for modulating light from the light source; and

an image shifting device provided on a light-exiting side of the liquid crystal display device for optically shifting, for every display frame, an image displayed on the liquid crystal display device.

10 22. An image display apparatus, comprising:

a display device; and

the image shifting device of claim 11 provided on a light-exiting side of the display device.

15 23. The image display apparatus of claim 22, wherein the display device is the liquid crystal display device of claim 1.

24. The image display apparatus of claim 21, wherein the image shifting device shifts light output from the display device in synchronization with a display operation of the display device.

25. A projection type liquid crystal display apparatus, comprising:

20 a light source;

the liquid crystal display device of claim 1 for modulating light from the light source;

an image shifting device provided on a light-exiting side of the liquid crystal display device for optically shifting, for every display frame, an image displayed on the liquid crystal display device; and

a projection optical system for projecting a combined image of shifted images

from the image shifting device.

26. A projection type liquid crystal display apparatus, comprising:

a light source;

a liquid crystal display device for modulating light from the light source;

5 the image shifting device of claim 11 provided on a light-exiting side of the
liquid crystal display device; and

a projection optical system for projecting a combined image of shifted images
from the image shifting device.

27. The projection type liquid crystal display apparatus of claim 26, wherein
10 the liquid crystal display device is the liquid crystal display device of claim 1.